Progression in Mental Strategies Policy

2022-2023

Progression in Mental Strategies Policy

This policy aims to give teachers guidance linked to the progression in teaching and learning of mental strategies from Nursery to year 6.

The expectation is that by the end of Key Stage 2, children should be able to use an efficient method for each operation confidently and with understanding. It is encouraged that children recognise how and when to use mental strategies to work out a calculation.

For calculations that they cannot do in their heads they choose an appropriate written method which they can use accurately and with confidence (refer to the Calculation Policy).

Early Years Foundation Stage

Skill	Teaching Ideas
Count on in 1s from 0 to 10.	Sing a range of counting songs. •Start counting from different points within 10 e. g start at 4 or 8 and count how many numbers to 10. •Ask children to say one more to a number within 10. •Ask children to count out different objects within the classroom to 10. •Ask children to show four fingers and then count on to 10.
Count back in 1s from 10 to 0.	•Ask children to count backwards from 10. •Use number cards. Children to order backwards from 10. •Show cards going backwards from 10. Ask children to spot the missing numbers. •Roll a die and count back from the number. •Sing 1 less than song. 1 less than 10 is…1 less than 9 is…. etc. (Use fingers)
Order numbers to 10.	•Children to order numbers from 1-10 in order. •Give children a random number e.g. 5 they carry on writing their numbers to 10. •Children fill in the missing numbers from 1-10. • Recite the numbers in the wrong order, ask them to spot the error. •Write the numbers forming them accurately from 1-10.

Say 1 more/1 less than a number to 20.	•Practice the language of more and less. Looking at objects and saying which has more or less. •1 more than song- 1 more than 1 is 2… •Play ping pong with numbers. When I say ping, you say pong, if I say 3 you say 4 (one more) can also be used with one less than. •Practical activities- put 7 sweets in the bag, put one more in. How many are in the bag? I want 1 less. How many have I got?
To recall subtraction facts to 5.	Vocabulary – take away, subtract •ICT games •Using fingers- we make our fingers sit down •Using objects. I have 5 fruit in the bowl, I eat 2 how many left? •Matching cards. •Number lines- start at a number, roll the dice and subtract from 5.
Double numbers to 5.	•Practice the language of doubles (twice as many, add the same number twice). •Sing the double song •Practice with objects •Role a dice, double and get that many objects.

Year 1-6

Skill	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number bonds ***Example*** ***Method***	Bonds to 10 and 20 6+4 16+4	Bonds to 100 90 + 10 60 +? = 100 52 +? = 60 Add 3 1 digit numbers identifying number bond to 10 6 + 2 + 4 = 12 6 + 4 = 10 + 2 = 12	Pairs of numbers that total 100 using knowledge of number bonds 32 + 68 = 32 +? = 100	Pairs of numbers that add together to make the next multiple of 100. 520 +? = 600 520 + 80 = 600 Decimal bonds to 1. 0.7 + 0.3 = 1 0.7 +? = 1	Decimal bonds. 7.2 + 0.8 = 8 7.2 +? = 8 What must be added to a decimal with units and tenths to make the next whole number?	Decimal bonds. 7.26 +? = 8 0.26 + **0.74** = 1 What must be added to a decimal with units, tenths and hundredths to make the next whole number?
Adding/subtracting multiples of 10 ***Example*** ***Method***	Add and subtract 10 to/from a single digit number 7 + 10 = 17 17 – 10 = 7	Add and subtract a multiple of 10 from any 2-digit number *Including bridging through 100* 32 + 20 65 – 30	Add and subtract a multiple of 10 from any 3-digit number *including bridging through 100s* 324 + 40 324 – 40	Add and subtract a multiple of 10 from any 4-digit number *including bridging through a 100/1000* 3423 + 50 3235 – 50	Add tenths to any decimal number *up to 1 decimal place* 0.1 + 0.5 = 0.6 25.3 + 0.5 = 25.8	Add tenths and hundredths to any decimal number *up to 2 decimal places* 25.34 + 0.5 16.15 + 0.04

Adding through 'adjusting' ***Example*** ***Method***	Add 9 and 11 to a single digit number by adding 10 then subtracting 1. 8 + 9 = 17 8 + 11 = 19	Add and subtract 9, 19, 11 and 21 to/from any 2digit number. 12 + 9 = 21 34 – 11 = 23 42 + 19 = 61	Add and subtract any 2-digit number to another 2-digit number ending in 8,9,1 or 2. **39** + 26 =	Add and subtract any 2-digit number to another 3-digit number ending in 8,9,1 or 2. 283 – 71 283 – 70 = 213 + 1 = 214	Add and subtract the nearest multiple of 10 or 100 then adjust 583 – 71 583 – 70 = 513 - 1 = 512 526 + 69	Add and subtract the nearest multiple of 10, 100 and 1000 then adjust 897 + 2002 897 + 2000 = 2897 + 2 = 2899
			39 + 1 = 40 + 26 = 66 – 1 = 65 **21** + 34 = 21 – 1 = 20 + 34 = 54 + 1 = 55		526 + 70 = 596 – 1 = 598	
Missing numbers using the inverse (Number block) ***Example*** ***Method***	Solve simple missing numbers (1 digit numbers) by counting on. ? – 9 = 7 7 =? – 9 5 +? = 11	Use the inverse to check/solve missing numbers (within 2 digits). ? – 14 = 28 28 + 14 = **42** 13 +? = 47 47 – 13 = **34**	Use the inverse to check/solve missing number problems (within 3 digits). ? – 123 = 150 150 + 123 = **273** 145 +? = 300 300 – 145 = **165**	Use the inverse to check/solve missing number problems (within 4 digits). ? – 3456 = 1300 3456 + 1300= **4756** 2340 + ____=5678 5678 – 2340= **3338**	Use the inverse to check/solve missing number problems (decimals-units and tenths) ? – 2.7 = 3 3 + 2.7 = **5.7** 7.8 + ____ = 8 8 – 7.8 = **0.2**	Use the inverse to check/solve missing number problems (decimals-units and tenths and hundredths) ? – 7.26 = 0.74 7.26 + 0.74= **8** 3.65 + ___=6.01 6.01 – 3.65 = **2.36**

<table>
<tr>
<td>X by 10, 100, 1000
Example
Method</td>
<td>Times 1 digit numbers by 10.
6 x 10 = 60
10 x 4 = 40</td>
<td>Times by 10 (within 10x12). Understand that numbers get 10x bigger. 6 x 10 = 60
10 x 11 = 110
H T O
6
6 0
←</td>
<td>Times by 10 and 100 within 3 digits. Understand that numbers get 10x/100x bigger.
23 x 10 = 230
10 x 40 = 400</td>
<td>Times decimals with 2dp by 10 and 100. Understand value of tenths and hundredths.

3.23m x 100=323cm

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<tr><td>H</td><td>T</td><td>0
•</td><td>1/10</td><td>1/100</td></tr>
<tr><td>3</td><td>2</td><td>3
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3</td><td>2</td><td>3</td></tr>
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<td>Times decimals with 3dp by 10 and 100. Understand value of tenths, hundredths and thousandths.

Refer to PV chart
←</td>
<td>Consolidation: Times decimals with 3dp by 10, 100 and 1000. Understand value of tenths, hundredths and thousandths.
Refer to PV chart
←</td>
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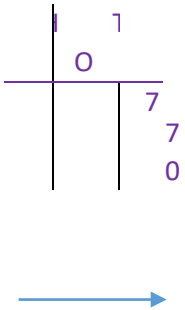
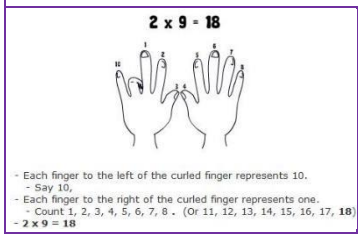
÷ by 10, 100, 1000 ***Example*** ***Method***	Divide a 2-digit number by 10. 70 ÷ 10 = 7 50 ÷ 10 = 5	Divide by 10 (within 10x12). Understand that numbers get 10x smaller. 70 ÷ 10 = 7 120 ÷ 10 = 12 	Divide by 10 and 100 within 3 digits. Understand that numbers get 10x/100x smaller. 230 ÷ 10 = 23 170 ÷ 10 = 17	Divide 1 or 2 digits by 10 and 100 Understand the value of tenths and hundredths 23cm÷ 100= 2.3m T 0 • 1/10 1/100 2 3 • 2 3 	Divide 1 or 2 digits by 10, 100 and 1000.Understand the value of tenths, hundredths and thousandths Refer to PV chart	Consolidation: Divide 1 or 2 digits by 10, 100 and 1000.Understand the value of tenths, hundredths and thousandths Refer to PV chart

Doubles/near doubles ***Example*** ***Method***	Recall doubles to 10 and add near doubles. 6 + 6 = 12 6 + 7 = 13	Recall doubles of numbers to 20 and multiples of 10 – 50. 13 + 13 = 26 40 + 40 = 80 Add near doubles within 2-digits (adjusting by 1). 13 + 14 = 13 + 13 = 26 **SO** 13 + 14 = 27. 39 + 40 = 40 + 40 = 80 **SO** 39 + 40 = 79	Recall doubles of multiples of 10 – 100. 90 + 90 = 180 Add near doubles within 2-digits (adjusting up to 10). 60 + 70 = 60 + 60 = 120 **SO** 60 + 70 = 130 16 + 18 = 15 + 15 = 30 **SO** 16 + 18 = 34 (adjust by 4).	Recall doubles by partitioning. Double 38 Double 30= 60 Double 8= 16 60+16= 76	Recall doubles of decimals 3.4 + 3.4 = 6.8	Consolidation: Recall doubles of decimals 3.4 + 3.4 = 6.8

Halving ***Example*** ***Method***	Recall halves to 20. Half of 12 = 6 Half of 16 = 8	Use number facts to recall halves to 100 (multiples of 10). Half of 80 = 40 Half of 8 = 4 (make 10x bigger). Halve 2-digit numbers by partitioning. Half of 36 = 18 Half of 30 = 15 Half of 6 = 3 15 + 3 = **18**	Use number facts to recall halves within 3 digits (multiple of 10). Half of 160 = 80 Half of 16 = 8 (make 10x bigger). Halve 3-digit numbers by partitioning. Half of 248 = 124 Half of 200 = 100 Half of 40 = 20 Half of 8 = 4 **100 + 20 + 4 = 124**	Recall halves by partitioning Half of 238 Half of 200=100 Half of 30= 15 Half of 8 = 4 100+15+4 =119	Recall halves of decimals Half of 12.6 Recall halves by finding 50%, 25%, 10% of a small whole numbers or quantities 50% of £8. ½ of 8 25% of £12. Halve and Halve again ¼ of £12	Consolidation: Recall halves of decimals Half of 12.6 Recall halves by finding 50%, 25%, 10% of a small whole numbers or quantities 50% of £8. ½ of 8 25% of £12. Halve and Halve again ¼ of £12

Times tables (all including division facts). ***Example Method***	To recognise times table patterns for the 2x, 5x and 10x tables. **Counting in 2s.** Pattern – 2,4,6,8,0 All even. **Counting in 5s**	To recall 2x, 5x, 10x and 3x tables. **2x tables** Add the number to itself 6 x 2, 6 + 6. Doubling. **5x tables**	To recall the 4x, 8x, 50x and 100x tables. **4x tables** All even. Double the 2x tables 4 x 6 = 24 **2** x 6 = 12, double = **24** Double then double again 4 x 7 =	To recall 6, 7, 9 x tables **6x tables** Calculate the 3 x table and double 4 x 6= **24** 4 x 3 = 12 12 doubled = 24 **7x tables** Calculate x 5 + x2 4 x 7= **28** 4 x 5 = 20 4 x 2 = 8	To use known facts to recall decimal times tables with up to 1dp: 0.3 x 7 = 2.1 0.3 x 10= 3 3 x 7= 21 21 ÷ 10 = **2.1** To use knowledge of multiplication facts to derive quickly squares of numbers to 12 x 12	Consolidation: To use known facts to recall decimal times tables with up to 1dp: 0.3 x 7 = 2.1 0.3 x 10= 3 3 x 7= 21 21 ÷ 10 = **2.1** To use knowledge of multiplication facts to derive quickly squares of numbers to 12 x 12
	Pattern – 0,5,0,5,0,5 **Counting in 10s** All end in a zero. Tens column goes up in 1s.	Times by 10 then halve. 5 x 6 10 x 6 = 60 Half of 60 = 30. **10x tables** Double the 5x tables.	Double 7 = 14 Double again = 28 **8x tables** All even. Double the 4x tables 8 x 6 = 48 **4** x 6 = 24, double = **48**	20 + 8 =28 **9x tables** Finger trick!  		and the corresponding squares of multiples of 10

		3x tables Count in 3s. The digits add to a multiple of 3 3 x 9 = 27 2 + 7 = 9 (multiple). Use this to check larger multiples… 3 x 13 = 39 3 + 9 = 12 (multiple).	Double, double then double again 8 x 7 = **56** Double 7 = 14 Double 14 = 28 Double 28 = **56** **11x tables** Answer is always repeated digits	Move on to making links e.g all answers add up to 9 2x 9= 18 1 + 8=9 3 x 9 = 27 2 + 7=9 4 x 9 = 36 3 +6 = 9		